

DUAL LOW NOISE OPERATIONAL AMPLIFIERS AZ4580

General Description

The AZ4580 is a monolithic dual low noise operational amplifier. It is specifically designed for audio systems to improve tone control; it can also be used in pre-amplifier, industrial measurement tools and applications where gain and phase matched channels are mandatory.

The IC features internal frequency compensation, low noise, low distortion, high gain and high bandwidth. The AZ4580 can operate under dual power supply voltage up to ±18V or single power supply up to 36V.

The AZ4580 is available in DIP-8, SOIC-8, SIP-8 and TSSOP-8 packages.

Features

- Large Signal Voltage Gain: 110dB Typical
- Low Input Noise Voltage: 0.7 μV_{RMS} (RIAA) Typical
- Wide Gain Bandwidth Product: 15 MHz at 10KHz Typical
- Low Distortion: 0.0005% Typical
- Slew Rate: 7V/μs Typical

Applications

- Audio AC-3 Decoder System
- Audio Amplifier

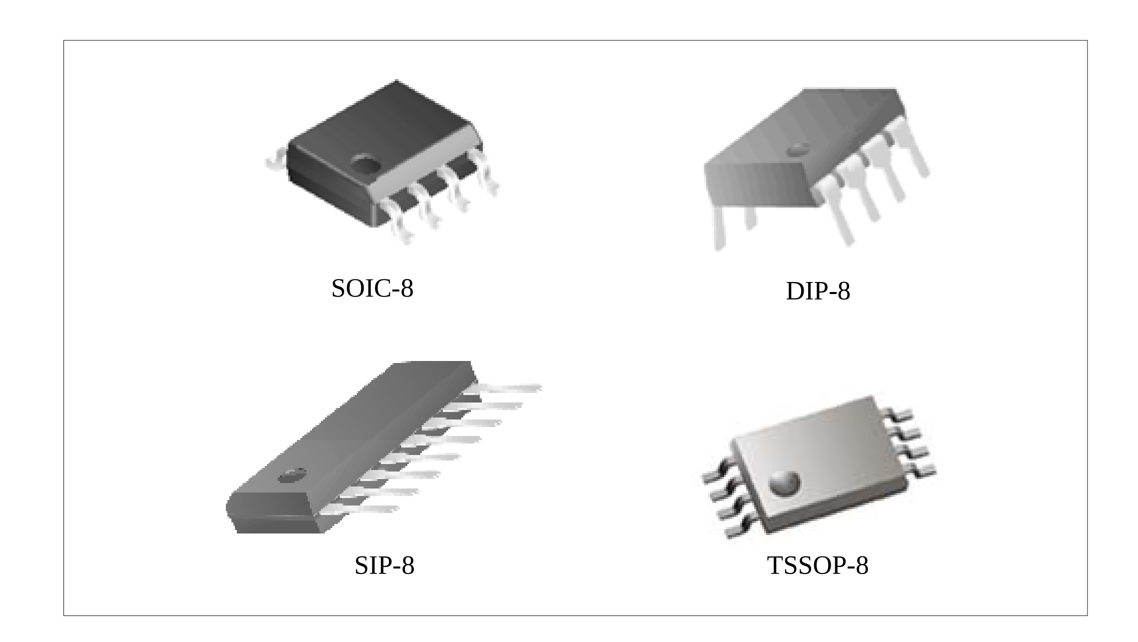


Figure 1. Package Types of AZ4580

Pin Configuration

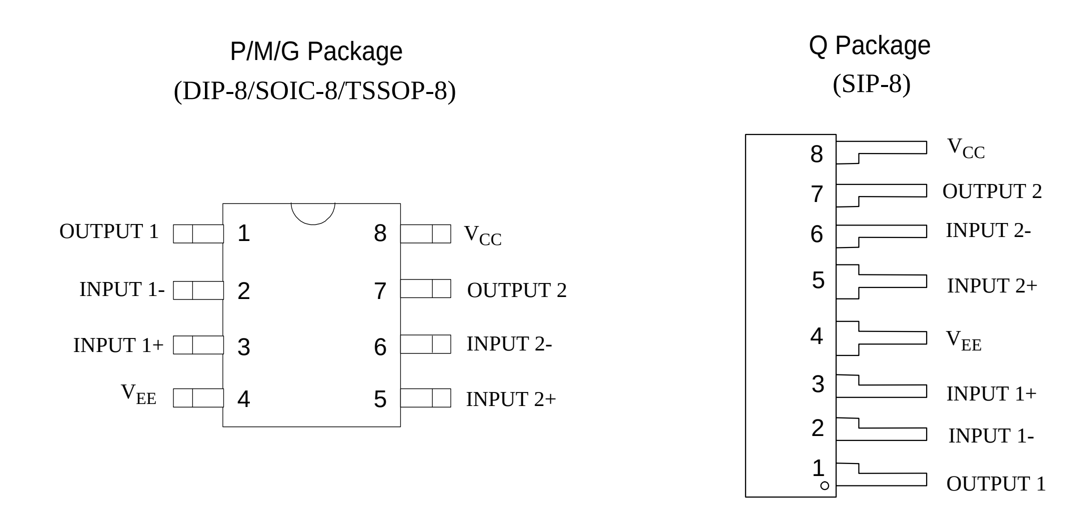


Figure 2. Pin Configuration of AZ4580 (Top View)

Pin Description

Pin No.	Function	Pin No.	Function	Pin No.	Function	Pin No.	Function
1	OUTPUT 1	2	INPUT 1-	3	INPUT 1+	4	V_{EE}
5	INPUT 2+	6	INPUT 2-	7	OUTPUT 2	8	V_{CC}

Functional Block Diagram

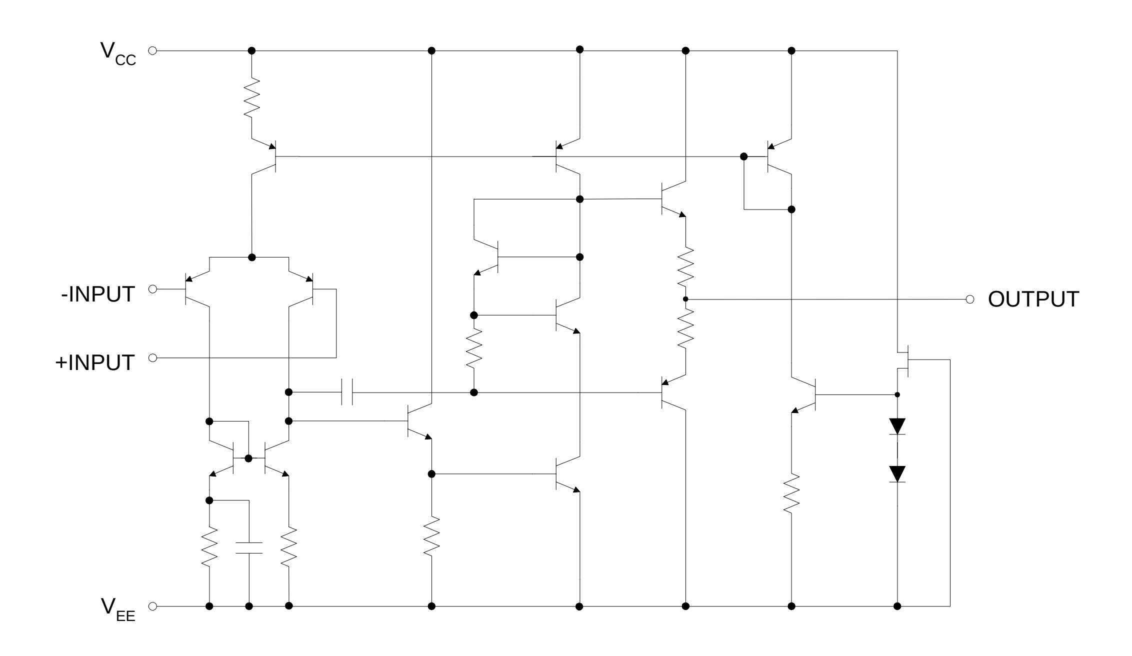
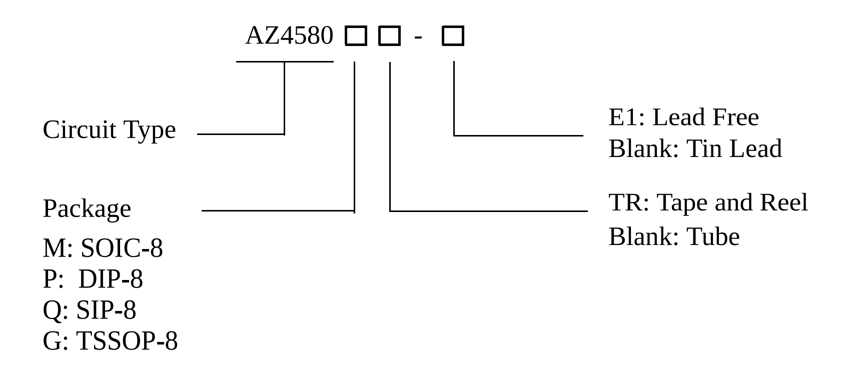


Figure 3. Representative Schematic Diagram of AZ4580 (Each Amplifier)

Ordering Information



Package	Temperature Range	Part Number		Marking ID		Packing Type
		Tin Lead	Lead Free	Tin Lead	Lead Free	
SOIC-8	-40 to 85°C	AZ4580M	AZ4580M-E1	4580M	4580M-E1	Tube
		AZ4580MTR	AZ4580MTR-E1	4580M	4580M-E1	Tape & Reel
DIP-8	-40 to 85°C	AZ4580P	AZ4580P-E1	AZ4580P	AZ4580P-E1	Tube
SIP-8	-40 to 85°C	AZ4580Q	AZ4580Q-E1	AZ4580Q	AZ4580Q-E1	Tube
TSSOP-8	-40 to 85°C	AZ4580G	AZ4580G-E1	G80	EG80	Tube
		AZ4580GTR	AZ4580GTR-E1	G80	EG80	Tape & Reel

BCD Semiconductor's Pb-free products, as designated with "E1" suffix in the part number, are RoHS compliant.

Absolute Maximum Ratings (Note 1)

Parameter	Smbol	Value		Unit
Power Supply Voltage	V_{CC}	+ 20		V
	V_{EE}	- 20		
Input Voltage	V_I	±15		V
Differential Input Voltage	V_{ID}	±30		V
Operating Junction Temperature	T_J	150		^oC
Storage Temperature Range	T_{STG}	-65 to 150		^oC
Lead Temperature (Soldering 10s)	T_L	260		^oC
Power Dissipation (T_A=25^{o}C)	P_D	TSSOP-8	400	mW
		SOIC-8	500	
		SIP-8	750	
		DIP-8	800	

Note 1: Stresses greater than those listed under "Absolute Maximum Ratings" may cause permanent damage to the device. These are stress ratings only, and functional operation of the device at these or any other conditions beyond those indicated under "Recommended Operating Conditions" is not implied. Exposure to "Absolute Maximum Ratings" for extended periods may affect device reliability.

Recommended Operating Conditions

Parameter	Min	Max	Unit
Supply Voltage	± 2	± 18	V
Operating Temperature Range	-40	85	^oC

Electrical Characteristics

Operating Conditions: V_{CC}=+15V, V_{EE}=- 15V, T_A=25^{o}C unless otherwise specified.

Parameter	Conditions	Min	Typ	Max	Unit
Supply Current	no load		4	7	mA
Input Offset Voltage	R_S≤10KΩ		0.5	3	mV
Input Offset Current	V_{CM}=0V		5	100	nA
Input Bias Current	V_{CM}=0V		150	500	nA
Input Common Mode Voltage Range		±12	±13.5		V
Common Mode Rejection Ratio	V_{CM}=0V to V_{CC}-1.5V, R_S≤10KΩ	80	110		dB
Large Signal Voltage Gain	R_L=2KΩ, V_O=±10V	90	110		dB
Power Supply Rejection Ratio	R_S≤10KΩ	80	110		dB
Output Sink Current	V-=1V, V+=0V, V_O=2V		80		mA
Output Source Current	V+=1V, V-=0V, V_O=2V		45		mA
Slew Rate	R_L≥2KΩ		7		V/µS
Gain Bandwidth Product	R_L=2KΩ, f=10KHz		15		MHz
Total Harmonic Distortion	A_V=20dB, V_O=5V R_L=2KΩ, f=1KHz		0.0005		%
Equivalent Input Noise Voltage	RIAA R_S=50Ω, 30KHz LPF		0.7		µV_{RMS}

Typical Performance Characteristics

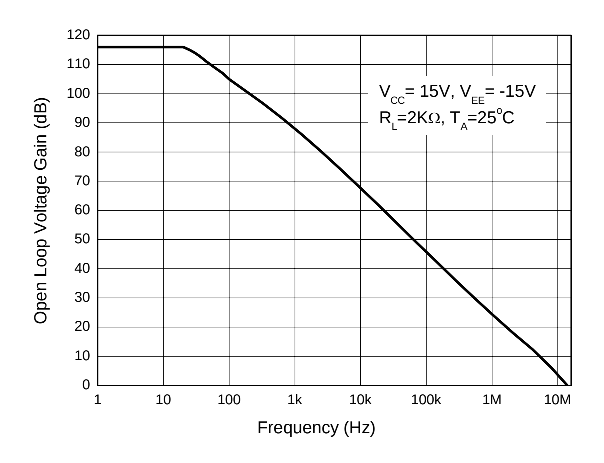


Figure 4. Open Loop Voltage Gain vs. Frequency

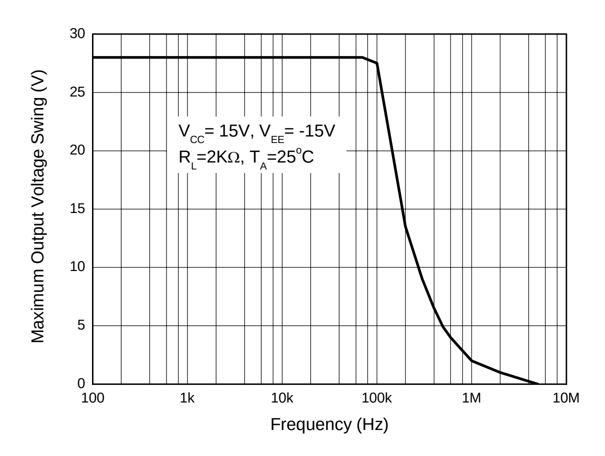


Figure 5. Maximum Output Voltage Swing vs. Frequency

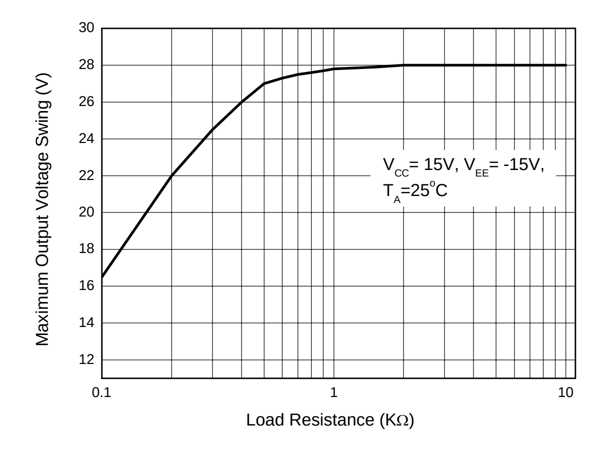


Figure 6. Maximum Output Voltage Swing vs. Load Resistance

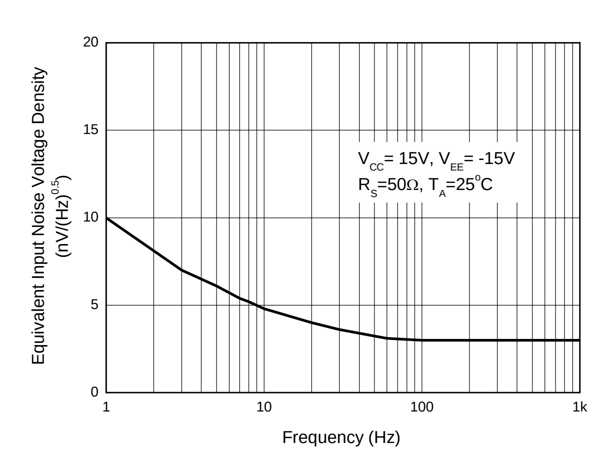


Figure 7. Equivalent Input Noise Voltage Density vs. Frequency

Typical Performance Characteristics (Continued)

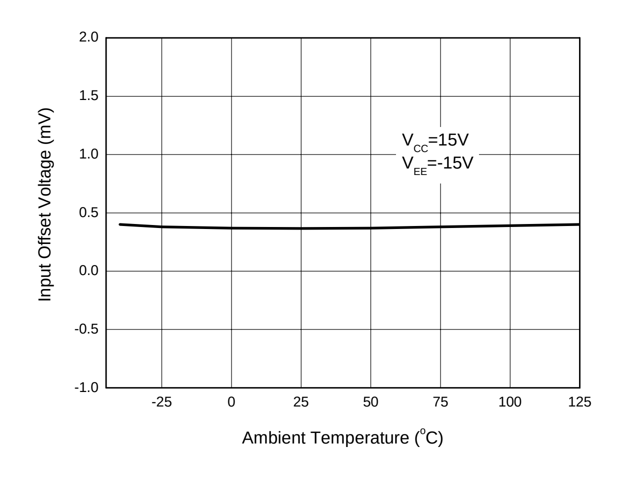


Figure 8. Input Offset Voltage vs.Temperature

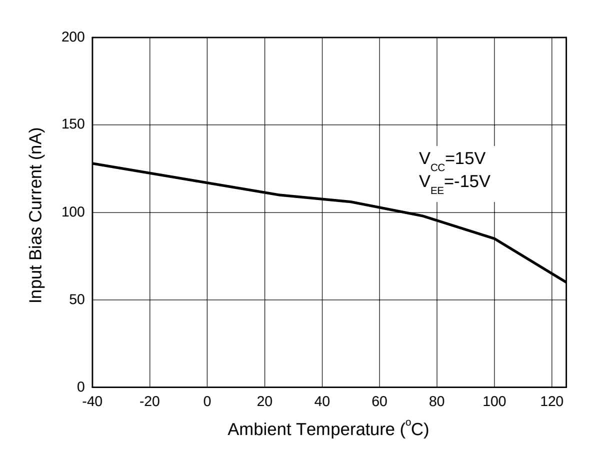


Figure 9. Input Bias Current vs.Temperature

Typical Applications

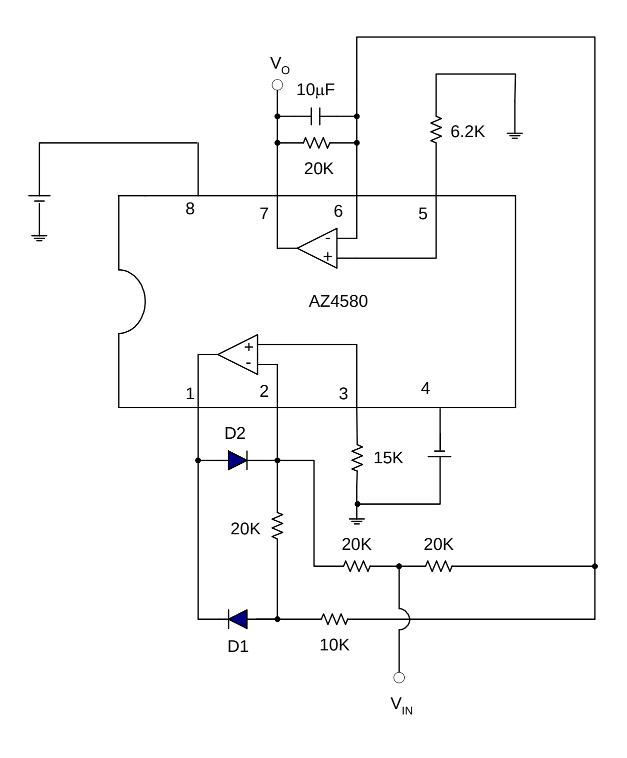


Figure 10. Application of AZ4580 in an AC/DC Converter



Typical Applications (Continued)

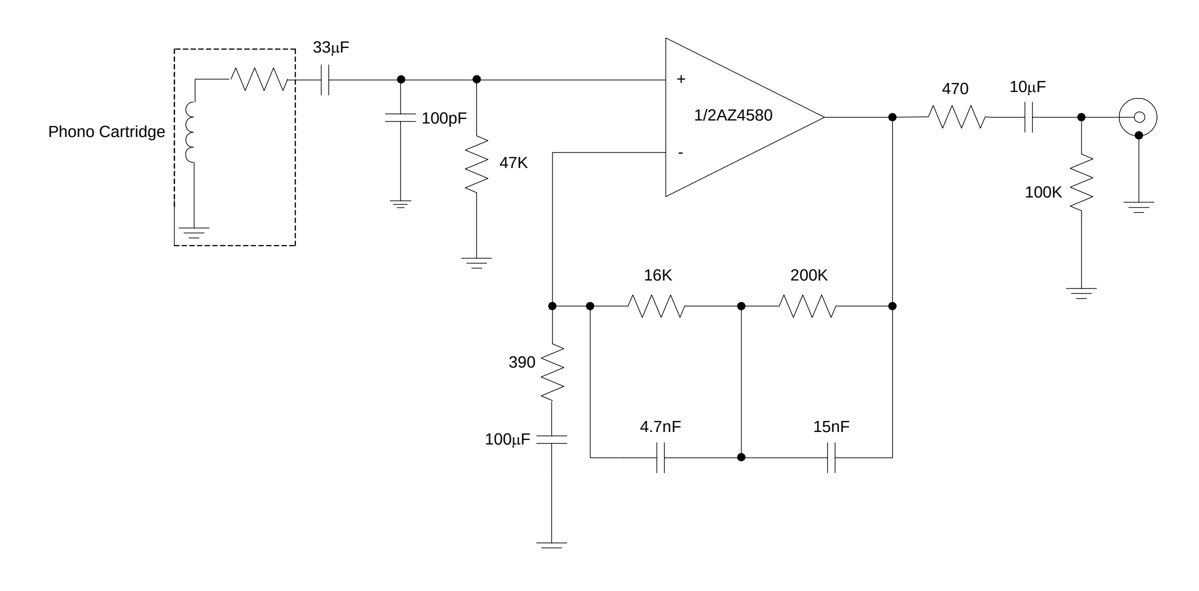


Figure11. Application of AZ4580 in a RIAA Preamp

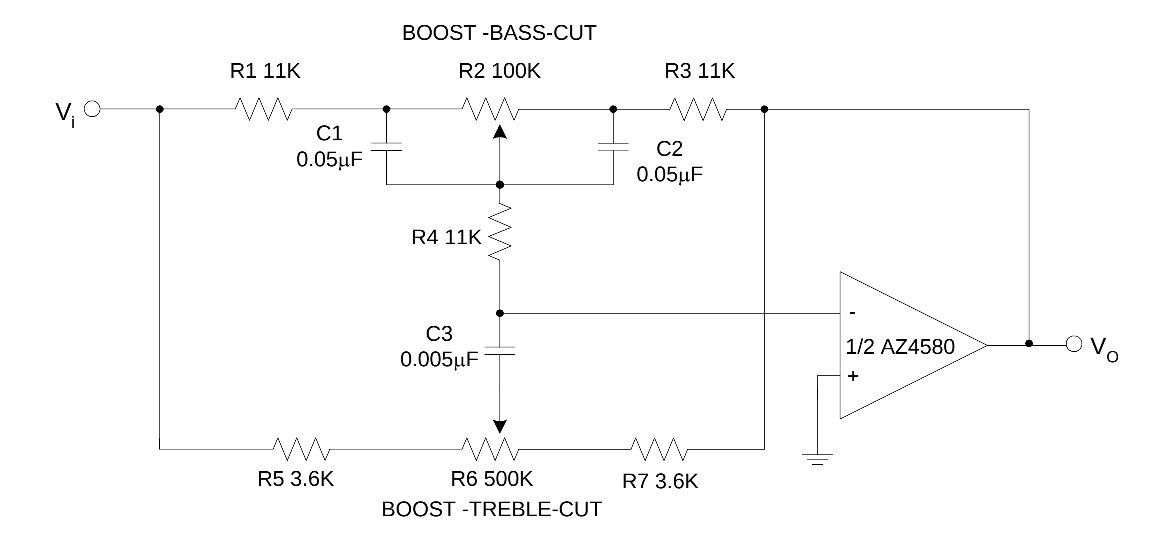


Figure12. Application of AZ4580 in Tone Control

Mechanical Dimensions

DIP-8 **Unit: mm(inch)**

0.700(0.028)
7.620(0.300)TYP
5°
1.524(0.060) TYP
6°
6°
3.200(0.126)
3.600(0.142)
3.710(0.146)
4.310(0.170)
4°
4°
3.000(0.118)
3.600(0.142)
0.510(0.020)MIN
0.204(0.008)
0.360(0.014)
0.254(0.010)TYP
0.360(0.014)
0.560(0.022)
2.540(0.100) TYP
8.200(0.323)
9.400(0.370)
0.130(0.005)MIN
R0.750(0.030)
6.200(0.244)
6.600(0.260)
Φ3.000(0.118)
Depth
0.100(0.004)
0.200(0.008)
9.000(0.354)
9.400(0.370)

Mechanical Dimensions (Continued)

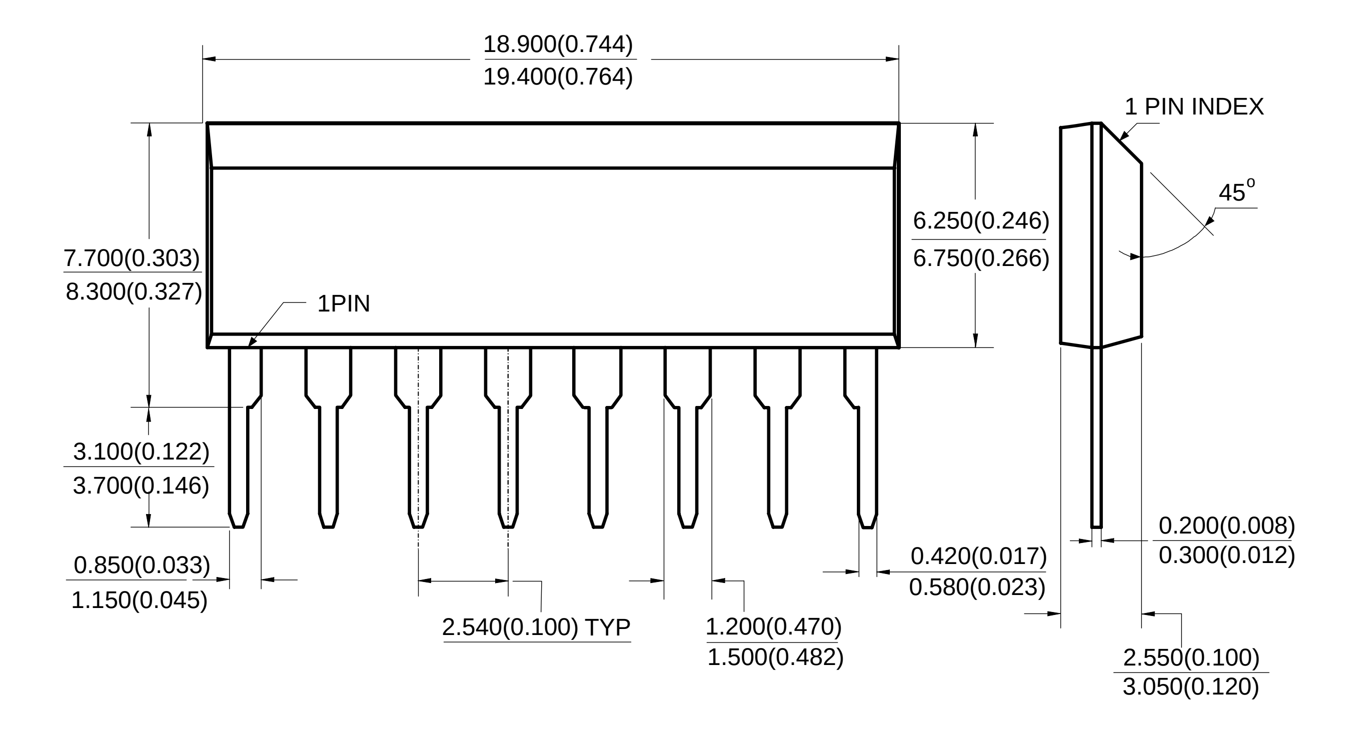
SOIC-8 **Unit: mm(inch)**

4.800(0.189)
5.000(0.197)
7°
7°
1.350(0.053)
1.750(0.069)
1.270(0.050)
TYP
0.100(0.004)
0.300(0.012)
0.320(0.013)
8°
8°
0.675(0.027)
0.725(0.029)
D
5.800(0.228)
6.200(0.244)
D
20:1
Φ 0.800(0.031)
0.200(0.008)
R0.150(0.006)
0°
8°
1.000(0.039)
3.800(0.150)
4.000(0.157)
1°
5°
0.330(0.013)
0.510(0.020)
0.900(0.035)
R0.150(0.006)
0.190(0.007)
0.250(0.010)



Mechanical Dimensions (Continued)

SIP-8 **Unit: mm(inch)**



Mechanical Dimensions (Continued)

TSSOP-8 **Unit: mm(inch)**

2.900(0.114)
3.100(0.122)
0.050(0.002)
0.150(0.006)
1.200(0.047)
MAX
0.800(0.031)
1.050(0.041)
SEE DETAIL A
0.090(0.004)
0.200(0.008)
4.300(0.169)
4.500(0.177)
6.400(0.252)
TYP
0.400(0.016)
0.650(0.026)
TYP
1.950(0.077)
TYP
0.190(0.007)
0.300(0.012)
12 °
TOP & BOTTOM
R0.090(0.004)
R0.090(0.004)
GAGE PLANE
0 °
8 °
0.450(0.018)
0.750(0.030)
SEATING
PLANE
0.250(0.010)
TYP
1.000(0.039)
REF
DETAIL A



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